

IN THE CLAIMS

Please amend the claims to read as follows:

Listing of Claims

1-25. (Canceled).

26. (New) A transmitting apparatus comprising:

a first modulation section that obtains a first modulated signal by modulating a first transmission data sequence;

a second modulation section that obtains a second modulated signal by mapping a second transmission data sequence at a signal point position of a predetermined modulation scheme; and

a plurality of antennas that transmit the first and second modulated signals,

wherein the first modulation section:

(i) includes a first mapping mode of mapping the first transmission data sequence to a signal point position using a same mapping rule as a mapping rule used in the second modulation section and a second mapping mode of mapping the first transmission data sequence to a signal point position rotated by a predetermined amount of a phase rotation from a signal point of the mapping rule used in the second modulation section;

(ii) maps identical data of the first transmission data sequence using the first and second mapping modes; and

(iii) obtains the first modulated signal by selectively outputting a modulated signal of the identical data obtained by using the first and second mapping modes, in a time direction or in a frequency direction.

27. (New) The transmitting apparatus according to claim 26, further comprising:
a receiving section that receives feedback information indicating a reception state of the
first and/or the second modulated signal from a transmitting party, wherein:
the first modulation section changes the amount of phase rotation in the second mapping
mode based on the feedback information.

28. (New) A transmitting apparatus that performs OFDM-MIMO transmission, the
apparatus comprising:
a first modulation section that obtains a first modulated signal by modulating a first
transmission data sequence;
a second modulation section that obtains a second modulated signal by mapping a second
transmission data sequence at a signal point position of a predetermined modulation scheme; and
a plurality of antennas that transmit the first and second modulated signals,
wherein the first modulation section:
(i) includes a first mapping mode of mapping the first transmission data sequence to a
signal point using a same mapping rule as a mapping rule used in the second modulation section
and a second mapping mode of mapping the first transmission data sequence to a signal point
position rotated by a predetermined amount of a phase rotation from a signal point of the
mapping rule used in the second modulation section;
(ii) maps identical data of the first transmission data sequence using the first and second
mapping modes; and

(iii) obtains the first modulated signal by selectively outputting a modulated signal of the identical data obtained by using the first and second mapping modes, in a time direction or in a frequency direction.

29. (New) The transmitting apparatus according to claim 28, wherein the first modulation section:

(iv) maps first data of the first transmission data sequence in the first and second mapping modes;

(v) at a first point in time, transmits at a same time the first data mapped by the first modulation section using the first mapping mode and second data of the second transmission data sequence mapped by the second modulation section using the predetermined modulation scheme; and

(vi) at a second point in time, transmits at the same time the first data mapped by the first modulation section using the second mapping mode and third data of the second transmission data sequence mapped by the second modulation section using the predetermined modulation scheme.

30. (New) The transmitting apparatus according to claim 28, wherein the first modulation section:

(iv) maps first data of the first transmission data sequence in the first and second mapping modes;

(v) at a first point in time, assigns the first data mapped by the first modulation section employing the first mapping mode and second data of the second transmission data sequence

mapped by the second modulation section employing the predetermined modulation scheme, to a first carrier, and transmits at a same time the first data and the second data; and

(vi) at the first point in time, assigns the first data mapped by the first modulation section employing the second mapping mode and third data of the second transmission data sequence mapped by the second modulation section employing the predetermined modulation scheme, to a second carrier, and transmits at the same time the first data and the third data.

31. (New) The transmitting apparatus according to claim 28, wherein:

the first mapping mode comprises a QPSK mode; and

the second mapping mode comprises a mode of mapping data to a signal point position applied a 45 degree phase rotation from a signal point arrangement of the QPSK mode.

32. (New) The transmitting apparatus according to claim 26, wherein the amount of phase rotation in the second mapping mode is changed in accordance with a number of times of transmission of identical data.

33. (New) The transmitting apparatus according to claim 28, further comprising:

a receiving section that receives feedback information indicating a reception state of the first and/or the second modulated signal from a transmitting party, wherein:

the first modulation section changes the amount of phase rotation in the second mapping mode based on the feedback information.

34. (New) A transmission method of a MIMO scheme, comprising:

a first modulation step of obtaining a first modulated signal by modulating a first transmission data sequence;

a second modulation step of obtaining a second modulated signal by mapping a second transmission data sequence at a signal point position of a predetermined modulation scheme; and

a transmission step of transmitting the first and second modulated signals from a plurality of antennas,

wherein the first modulation step:

(i) contains a first mapping mode of mapping the first transmission data sequence to a signal point using a same mapping rule as a mapping rule used in the second modulation step and a second mapping mode of mapping the first transmission data sequence to a signal point position rotated by a predetermined amount of a phase rotation from a signal point of the mapping rule used in the second modulation step;

(ii) maps identical data of the first transmission data sequence using the first and second mapping modes; and

(iii) obtains the first modulated signal by selectively outputting a modulated signal of the identical data obtained by using the first and second mapping modes, in a time direction or in a frequency direction.

35. (New) The transmission method according to claim 34, wherein the first modulation step comprises:

(iv) mapping first data of the first transmission data sequence in the first and second mapping modes;

(v) at a first point in time, transmitting at a same time the first data mapped by the first modulation step using the first mapping mode and second data of the second transmission data sequence mapped by the second modulation step using the predetermined modulation scheme; and

(vi) at a second point in time, transmitting at the same time the first data mapped by the first modulation step using the second mapping mode and third data of the second transmission data sequence mapped by the second modulation step using the predetermined modulation scheme.

36. (New) The transmission method according to claim 34, wherein the first modulation step comprises:

(iv) mapping first data of the first transmission data sequence in the first and second mapping modes;

(v) at a first point in time, assigning the first data mapped by the first modulation step employing the first mapping mode and second data of the second transmission data sequence mapped by the second modulation step employing the predetermined modulation scheme to a first carrier, and transmitting the first data and the second data at a same time; and

(vi) at the first point in time, assigning the first data mapped by the first modulation step employing the second mapping mode and third data of the second transmission data sequence mapped by the second modulation step employing the predetermined modulation scheme to a second carrier, and transmitting the first data and the third data at the same time.

37. (New) A transmission method of an OFDM-MIMO scheme, comprising:

a first modulation step of obtaining a first modulated signal by modulating a first transmission data sequence;

a second modulation step of obtaining a second modulated signal by mapping a second transmission data sequence at a signal point position of a predetermined modulation scheme; and

a transmission step of transmitting the first and second modulated signals from a plurality of antennas,

wherein the first modulation step:

(i) contains a first mapping mode of mapping the first transmission data sequence to a signal point using a same mapping rule as a mapping rule employed in the second modulation step and a second mapping mode of mapping the first transmission data sequence to a signal point position rotated by a predetermined amount of a phase rotation from a signal point of the mapping rule employed in the second modulation step;

(ii) maps identical data of the first transmission data sequence employing the first and second mapping modes; and

(iii) obtains the first modulated signal by selectively outputting a modulated signal of the identical data obtained by employing the first and second mapping modes, in a time direction or in a frequency direction.

38. (New) The transmission method according to claim 37, wherein the first modulation step comprises:

(iv) mapping first data of the first transmission data sequence in the first and second mapping modes;

(v) at a first point in time, transmitting at a same time the first data mapped by the first modulation step employing the first mapping mode and second data of the second transmission data sequence mapped by the second modulation step employing the predetermined modulation scheme; and

(vi) at a second point in time, transmitting at the same time the first data mapped by the first modulation step employing the second mapping mode and third data of the second transmission data sequence mapped by the second modulation step employing the predetermined modulation scheme.

39. (New) The transmission method according to claim 37, wherein the first modulation step comprises:

(iv) mapping first data of the first transmission data sequence in the first and second mapping modes;

(v) at a first point in time, assigning the first data mapped by the first modulation step employing the first mapping mode and second data of the second transmission data sequence mapped by the second modulation step employing the predetermined modulation scheme to a first carrier, and transmitting the first data and the second data at a same time; and

(vi) at the first point in time, assigning the first data mapped by the first modulation step employing the second mapping mode and third data of the second transmission data sequence mapped by the second modulation step employing the predetermined modulation scheme to a second carrier, and transmitting the first data and the third data at the same time.

40. (New) The transmission method according to claim 37, wherein:

the first mapping mode comprises a QPSK mode; and
the second mapping mode comprises a mode of mapping data to a signal point position
applied a 45 degree phase rotation from a signal point arrangement of the QPSK mode.

41. (New) The transmission method according to claim 37, wherein the amount of phase rotation in the second mapping mode is changed in accordance with a number of times of transmission of identical data.

42. (New) A transmitting apparatus comprising:
a first transmitting section that forms a first transmission signal based on a first modulated signal and transmits the first transmission signal from a first antenna; and
a second transmitting section that forms a second transmission signal based on a second modulated signal obtained by mapping at a predetermined signal point position and transmits the second transmission signal from a second antenna, wherein:
the first transmitting section comprises a modulation section that forms the first modulated signal to which a signal point position is remapped by selecting a new signal point position among the predetermined signal point position and a plurality of signal point positions different from the predetermined signal point position on a predetermined symbol basis, and the first transmitting section transmits the first transmission signal based on the first modulated signal from the first antenna using the same bandwidth as the second transmission signal.

43. (New) The transmitting apparatus according to claim 42, further comprising an orthogonal frequency division multiplexing section that performs orthogonal frequency division multiplexing of the first transmission signal and the second transmission signal.

44. (New) The transmitting apparatus according to claim 43, further comprising:
a receiving section that receives feedback information indicating at least one reception state of the first transmission signal and the second transmission signal, wherein:
the first transmitting section selects the new signal point position based on the feedback information.